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United States Department of Agriculture

Facilities Condition Assessment Field Training Guide



Forest
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National Technology &
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About the Authors

Kathleen Snodgrass joined the Missoula Technology and Development Center (MTDC) as a project leader in 2001. She began her career with the Forest Service at the Nez Perce National Forest working in facilities, landscape architecture, land line, and general engineering before serving as the facilities architect for about 7 years. She also spent about 10 years working in highway design and construction with the Idaho Division of Highways

after graduating from Washington State University in 1974 with a bachelor's degree in architectural studies.

Kathleen C. Marks is a multidisciplinary project leader at MTDC for the facilities and environmental compliance and protection (ECAP) programs. She began work for MTDC in 2010 after receiving a bachelor's degree in civil engineering from Montana State University.

Cover—This 1934 building at the Cle Elum Ranger Station on the Okanogan-Wenatchee National Forest, Pacific Northwest Region is still in use and is in serviceable condition.

Facilities Condition Assessment Field Training Guide



Kathleen Snodgrass
Project Leader

Kathleen Marks
Project Assistant

USDA Forest Service
National Technology and Development Program
Missoula, MT

9E92L11 Facility Inspection Field Guide

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The Facility Condition Assessment Form

This training guide is a memory-jogger that you can take with you as you perform facility condition assessments. It contains the same items in the same order as the complex facility condition assessment form that is used to record work items for entry into the Natural Resources Manager (NRM) Infra database. Use this guide to perform condition assessments in a manner consistent with those performed by other inspectors throughout the Forest Service.


Keep in mind that facility condition assessments are only intended to record major facility maintenance needs. Performing operations work and minor maintenance work on a regular basis is important, but such work is not recorded through the

facility condition assessment process. The National Technology and Development Program (T&D) report "So That's Why It's Always Cold in Here: A Guide for Conducting Facilities Condition Assessment Surveys," (0473–2839–MTDC) provides detailed guidance for inspecting buildings and associated assets to determine their condition and what work is needed to correct deficiencies, including operations and minor maintenance. The report is available in printed form from the Missoula Technology and Development Center (MTDC) or electronically at http://fsweb.mtdc.wo.fs.fed.us/php/library_card.php?p_num=0473_2839.

This guide does not explain how to properly conduct condition assessments on Forest Service buildings. You will need to take the 7100—Basic Building Condition Assessment and Work Items or 7300—Complex Building Condition Survey Training course in person or through AgLearn before using this guide in the field.

This guide does not explain how to use the NRM Infra database. Please see your supervisor and forest NRM specialist if you need more information about NRM or role assignments to access and modify data in the NRM Infra database.

Before using this guide in the field, print the condition assessment form for each building using the NRM Infra report BLD-SRV01JRL: Facility Condition Assessment Form (figure 1). NRM Infra automatically populates the header information for the printed form, except for the inspector signature, inspection date, and inspector name. Check to ensure that you've printed the appropriate form (complex versus basic building) and that the header information is accurate.



Facility Condition Assessment Form

Bldg ID: 2001

Admin Org: 1382

Land Unit ID: 8901

Land Unit Type: ADMINISTRATIVE_SITE

Category: OFFICE

Subcategory: Office

Ownership: NATIONAL FOREST (FS)

Year Constructed: 2002

CRV: S16,494,283.03

Bldg Name: MTDC OFFICE AFD

Admin Org Name: Missoula Technology and Development

Land Unit Name: ADMIN CONGLOMERATION

Bldg Type: COMPLEX

Status: EXISTING - ACTIVE

Historic Status: NOT EVALUATED

Gross SqFt: 66715

Master Plan: RETAIN FOR EXISTING USE

Planning Action: UNCHANGED

Inspector Signature: _____

Inspection Date: _____

Inspector Name: _____

Date of Last Inspection: 05/13/2008

RP Inventory Req'd: Y

Maintenance Level: 4

Estimated Travel Time (Hrs): 1 HOUR

Latitude: 46.92780287

Longitude: -114.0953476

Work Item #	1st Level	Work Items	Typical Life Cycle (Yrs)	Measurements		Reason 1-Resource 2-Mission 3-H&S	Date Needed (mm/dd/yyyy)	Critical (If yes, check box)
				Quantity	Units			
01001	Other	Building Replacement, Complete Remarks:	50		LS			<input type="checkbox"/>
02001	Site Improvements	Parking lot, repair and seal coating (per 10,000 S.F.) Remarks:	5		M.S.F			<input type="checkbox"/>
02002	Site Improvements	Parking lot, repair and resurface: Remarks:	10		MSF			<input type="checkbox"/>
02003	Site Improvements	Concrete, sidewalk or curb, Remove/Replace Remarks:	25		LF			<input type="checkbox"/>

Figure 1—Part of the Facility Condition Assessment Form for the Missoula Technology and Development Center office/lab/shop.

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Be sure to check the gross square feet (Gross SqFt) of the building to ensure that it is correct. Compute gross square feet using physical or as-built plan measurements to the outside faces of exterior walls for all stories of the building. **Don't include** crawl spaces or areas with less than a 3-foot clear ceiling height. **Don't include** the open air over a double height room as part of the floor above; count only the floor area that can be walked on. **Do include** excavated basement areas, indoor mechanical spaces, mezzanines, penthouses and attics with floors, garages, covered porches (with or without walls), balconies you can stand on, and interior or covered corridors or walkways. **Do include** the footprints of stairways, elevator shafts, and vertical duct shafts as gross area on each floor through

which they pass. If this explanation is confusing, more details and sketches showing how these rules are applied to a building are available at the U. S. Department of Education's Facilities Inventory and Classification Manual Web page <<http://nces.ed.gov/pubs2006/ficm/content.asp?ContentType=Section&chapter=3§ion=2&subsection=1>>.

All work item costs automatically populate when your inspection data is entered into the NRM Infra database. The costs include the RS Means estimated cost multiplied by 1.10 for design costs, by 1.10 for contracting costs, and by 1.15 for overhead costs. The RS Means costs are updated each year to match the current national average costs of the work.



A multiplier is also applied to all work items to account for the increasing costs as the distance increases from the building to the nearest town with contractors and supplies. The multiplier is based on the Estimated Travel Time (Hrs) value that is entered on the Building Details screen in the NRM Infra database. The multiplier is 1.0 for 1 hour of travel time, 1.5 for 2 hours, 2.0 for 4 hours, 3.0 for 8 hours, and 4.0 for more than 8 hours of travel time. The estimated travel time is shown in the Facility Condition Assessment Form header. Check this value for accuracy. If it is inaccurate, correct it on the Buildings screen before entering work items.

Another multiplier, 1.5, is automatically applied to all work items for buildings with **Historic Status** in the NRM Infra database of **EVALUATED/MEETS** (has been evaluated and meets National

Register criteria), **IN/PENDING** (included in the National Register of Historic Places or on a pending list), or **MEETS AGE/FRTHR** (more than 50 years old, but requires further evaluation). The Facility Condition Assessment Form header shows the Historic Status. Check this value for accuracy. If it is inaccurate, correct it on the Buildings screen before entering work items.

Whether you are assessing a complex or basic building, all the standard work items are on the Facility Condition Assessment Form. Complex buildings have 62 standard work items and simple buildings have 16 standard work items. This guide addresses each work item in the same order as on the printed complex building form. If you are inspecting a basic building, ignore the work items in this guide that are not on your form.

Filling in the Facility Condition Assessment Form

You will need to physically inspect each building and fill in **Quantity**, **Reason**, and **Date Needed** for each item that requires repair, and check the box in the **Critical** column, if necessary. The cost for each item self-populates from an interface with the current edition of RS Means Building Construction Cost Data when the information from the printed form is entered electronically into the NRM Infra database.

Quantity of work must be measured, calculated, or counted, unless the preprinted unit is LS (lump sum). If the unit is LS, the quantity is always “1” if the work is needed and “0” if no work is needed.

Other units of measure are:

- CSF:** 100 square feet
- EA:** each
- LF:** linear feet
- M.S.F.:** 10,000 square feet
- MSF:** 1,000 square feet
- SF:** square feet
- SQ:** 100 square feet
- STEP, EA:** stair riser
- SYSTEM:** each complete system

To calculate square feet, measure the length and width (or length and height for vertical surfaces) in feet, then multiply length by width (or length by height). CSF, MSF, SQ, and M.S.F. are variants of SF, and are explained further under items using these units of measure. Do not confuse M.S.F. with MSF. Available fonts prevented use of the Roman numeral for 10,000 on the form. Designating 10,000 square feet as M.S.F. was the workaround.

The **Reason** column identifies the reason for performing the work. It contains only three choices:

1. Resource protection work items must be performed to avoid damage, obstruction, or negative impact to a natural or cultural resource.
2. Mission work items must be completed to ensure the ability of employees to carry out the Forest Service mission. Needs are related to administration and providing services (transportation, recreation, grazing, etc.) that do not fall into the H&S or Resource categories.
3. Health and safety (H&S) work items are necessary to address immediate threats to human health and safety.

In the **Date Needed** column, you normally should write in the last day of the fiscal year in which the work needs to be performed.

Check the box in the **Critical** column only if completion of the work item is necessary to correct a serious and immediate threat to health or safety, a natural or cultural resource, or the ability of the Forest Service to carry out its mission. Other work items necessary to address potential risks to public or employee safety or health; compliance with codes, standards, regulations, etc.; or needs that address potential adverse consequences to natural resources or mission accomplishment are considered noncritical. For example:

- Complying with Notices of Violation (Occupational Safety and Health Administration [OSHA], Environmental Protection Agency [EPA], etc.) is a critical health and safety need.

- Preventing irreversible damage to or loss of a historic structure is a critical resource protection need.
- Providing accessibility for people with disabilities is a noncritical health and safety need.
- Complying with Federal, State, and local building codes is a noncritical health and safety need.
- Making modifications to accommodate increased visitation is a noncritical mission need.
- Energy efficiency or renewable energy retrofits are a noncritical mission need.

Please **DO** check your data to ensure that everything is entered correctly, including the unit of measure.



Inspection Tips

Experienced inspectors provided the following tips to help you perform a quicker, more effective inspection.

- Use two people to survey large labs or office buildings. One person can measure while the other records.
- Use a set of as-built plans (if available) to count light fixtures, windows, etc.
- If you don't have as-built plans, sketch a simple floor plan as you inspect to show doors, windows, flooring types, and dimensions. Keep the sketch in the building file for future reference.
- Builders often use rules of thumb to estimate quantities. You can, too, where it seems prudent. For instance:

» Multiply the gross square feet of the finished area of a house by 4.5 for a good approximation of the total square feet of gypsum board that would be needed to completely replace the gypsum board inside the house. If the garage is a full-finish structure, multiply its square footage by 2.25 and then add the result to the house total. A reasonable multiplier for small office buildings is 3.2.

◊ These estimating multipliers also work for repainting the entire interior.

» Each region has a cooling ratio that is either implied or dictated by the local building officials. The ratio states how many square feet can be conditioned per ton of cooling. If you know this ratio, you can easily estimate the tons of cooling capacity needed for the building.

- » Use the adjustment factors shown in table 1 to figure the roof area on the slope, if you know the roof pitch and the horizontal area covered by the roof (including overhangs). Multiply the covered area by the adjustment factor.

Table 1

Roof Slope	Adjustment Factor
3 in 12	1.031
4 in 12	1.054
6 in 12	1.118
8 in 12	1.202
12 in 12	1.414

- After entering the work items into the NRM Infra database, check your entered data to ensure that you entered everything correctly and that you used the unit of measure the work item requires.
 - » Enter roofing and siding quantities in 100 square feet units (CSF), not square feet units (SF).
 - » Enter parking lot seal coat in 10,000 square feet units (M.S.F.), and parking lot resurfacing in 1,000 square feet units (MSF).

- A work item is deferred maintenance if the material has been in place longer than the typical life cycle listed on the page for each work item. A carpet that was installed in 2000 and inspected in 2012 was 12 years old when inspected. Because the life cycle for carpeting is 8 years, replacing the carpet would be considered deferred maintenance using the Forest Service standard, even if the carpet was still in good condition. Whether you agree with this logic or not, please conform to the standard so our practices remain uniform and defensible.

- A list of survey tools a facility inspector may wish to take along to increase efficiency when performing condition assessment inspections is available at <<http://fsweb.wo.fs.fed.us/eng/programs/facilities/documents/ToolList.doc>>.

Work Items

The remainder of this guide consists of information about the standard work items. Each work item has its own page that includes a photo or two depicting the item as well as information to help you decide whether the item applies to the building you're inspecting, how often this work normally is needed, and how to measure and record the quantity of work. This guide includes much of the information included in the "Building Work Items Data Dictionary" <<http://fsweb.wo.fs.fed.us/eng/programs/facilities/documents/BldgsWIDDictionary.pdf>>.

In the interest of minimizing the number of work items, similar work is sometimes grouped together under a single work item. The actual replacement costs for these similar items aren't identical, so a representative cost is used. The work item title may not reflect the range of work covered by the item. Check the **considerations** bullets for more information about the work included in the item.

If the standard work items don't cover needed major maintenance work, you may need to create a custom work item, as explained following the standard work item pages.



Notes

Work Item 01001—Building Replacement, Complete

Definition: Remove and replace an entire building (figures 2 and 3).

Unit of Measure: lump sum (LS).

Typical Life Cycle: 50 years.

- A well constructed and maintained building can last several hundred years, and a poorly constructed and maintained building may become unusable in a decade or two. Base the replacement decision on the condition and function and not the age of the building.

Considerations:

- Replacement is justified if a building is still needed, but:
 - » Deferred maintenance costs exceed the current replacement value shown in the NRM Infra database.
 - » The building becomes functionally obsolete.
 - » The building cannot be modified to meet accessibility standards.
- Check the Facilities Master Plan (FMP) to see whether the building is needed.
- Decide whether this work item is appropriate based on the FMP decision and the building's condition.
- If this item is selected, **DO NOT** record any other work items for this building.



Figure 2—This old barn is in extremely poor condition. If the Facilities Master Plan shows a continuing need for barn or storage space here, the barn should be replaced. If not, the barn should be removed.



Figure 3—Buildings that can't be modified to meet accessibility requirements need to be replaced, if the function they provide is still required. This outhouse is too small to provide the required turning space.

Work Item 02001—Parking Lot, Repair and Seal Coating (per 10,000 S.F.)

Definition: Perform minor repairs, apply emulsified asphalt seal coat to the asphalt-paved surface, and paint traffic and parking markings (figure 4).

Unit of Measure: 10,000 square feet (M.S.F.).

- To determine the number of units, calculate the total area in square feet, then divide by 10,000. Round to the nearest tenth. Enter this number as the quantity. Example:
 $67,543 \text{ SF} \div 10,000 \text{ (SF per M.S.F.)} = 6.7543 \text{ M.S.F.}$
Rounded to the nearest tenth = 6.8 M.S.F.

Typical Life Cycle: 5 years.

Considerations:

- Includes thoroughly cleaning the surface, patching holes, filling cracks, applying two coats of petroleum emulsion, and restriping the parking lot.
- Includes asphalt seal only, not chip seal; use a custom item for chip seal.
- Asphalt parking lots need to be maintained with an emulsified asphalt seal coat about every 5 years to maximize pavement life.
- Use only for pavement associated with a building, not a road.
- Use only for parking lots that are in relatively good condition.



Figure 4—This supervisor's office parking lot is in pretty good condition, but could use a seal and repainting.

Work Item 02002—Parking Lot, Repair and Resurface

Definition: Repair defects, place 2-inch-thick asphalt pavement overlay on asphalt-paved surfaces, and paint traffic and parking markings (figure 5).

Unit of Measure: 1,000 square feet (MSF).

- To determine the number of units, calculate the total area in square feet, then divide by 1,000. Round to the nearest tenth. Example: $485 \text{ SF} \div 1,000 \text{ SF per MSF} = 0.485 \text{ MSF}$. Rounded to the nearest tenth = 0.5 MSF.

Typical Life Cycle: 10 years

- Asphalt pavement may last much longer if properly maintained.

Considerations:

- Includes thoroughly cleaning the surface, patching holes, filling cracks, applying an emulsion tack coat, laying an asphaltic concrete wearing course, and restriping the lot.
- Use only for pavement associated with a building, not a road.
- Use when the aggregate base is generally sound but the asphalt is broken up, has potholes, and, in general, is in poor but salvageable condition.



Figure 5—The raveling, developing potholes, and alligatoring on this parking lot and driveway can't be cured by a seal coat; it should have an asphalt overlay.

Work Item 02003—Concrete, Sidewalk or Curb, Remove/Replace

Definition: Replace concrete or asphalt curbs (figure 6) or sidewalks (figure 7).

Unit of Measure: linear feet (LF) of sidewalk or curb.

- Sidewalk only: measure linear feet to the nearest foot for a sidewalk that is 24 to 48 inches wide. If the sidewalk is wider than 48 inches, record proportionally more length.
- Curb only: measure linear feet to the nearest foot.
- Both sidewalk and curb: measure linear feet of each to the nearest foot and add the lengths together.

Typical Life Cycle: 25 years.

- Concrete typically has a long life, but may become degraded because of overloading or poor initial construction. Continued exposure to freeze-thaw cycles may shift

alignment vertically or horizontally, creating tripping hazards and making surfaces nonaccessible.

Considerations:

- Includes removing the existing sidewalk or curb, placing a 3-inch-thick, vibratory-plate-compacted aggregate base and a 4-inch-thick, broom-finished concrete sidewalk or formed curb with gutter.
- Does not include repair work, such as patching or grinding, which is minor maintenance.



Figure 6—This curb and gutter are deteriorating and no longer provide good drainage flow, so they should be replaced.



Figure 7—Two short sections of this sidewalk should be replaced to correct the vertical alignment shift on the left and the horizontal shift on the right. Use work item 15001 to record the needed work to provide accessibility at the door.

Work Item 02004—Fence, All, Remove/Replace or Install New

Definition: Remove and replace existing fencing (figure 8) and gates (figure 9).

Typical Life Cycle: 20 years.

Unit of Measure: linear feet (LF) of fence.

- Measure to the nearest foot the linear feet of the section of fence that needs to be replaced.

Considerations:

- Includes replacing wornout fences of all standard quality types (worm, picket, chain link, barbed wire, etc.) regardless of height or material, including gates.
- Does not include premium quality fencing, such as replicating an elaborate historic pattern or extensive use of exotic hardwoods. If such work is necessary, it is a custom item.
- Does not include fence repair or routine maintenance, such as tightening wires, staining, or replacing a couple of pickets.



Figure 8—Although the stain hides most of the deficiencies, the posts of this fence are rotted at the base, cracked at the top, and the rails are deteriorated. This fence should be replaced.



Figure 9—This gate may still be fine for use in a low-security area, even though the wire panel is warped. If the gate is in an area with high-security needs, it should be replaced.

Work Item 02005—Electric, Outdoor Pole Lights, Remove/Replace or Install New

Definition: Remove and replace an outdoor light fixture, complete with supporting pole or bollard (figure 10).

Typical Life Cycle: 20 years.

Unit of Measure: each (EA).

Considerations:

- Includes replacing security or parking lot site light fixtures. Does not include replacing landscape lights, wall packs, or other less expensive outdoor lights, which are included in work item 13004.
- Includes turning the branch circuit off, positioning the truck, raising and lowering the boom bucket, removing

and installing the pole and 400 W HPS fixture with lamp and ballast, testing the pole-mounted fixture, and turning the branch circuit back on.

- Consider relamping costs (labor, equipment, and frequency of bulb replacement) when choosing new site lights. Relamping site lights is an operations expense.
- Before recording this item in the NRM Infra database, check to ensure that the Forest Service owns the light(s). Many utility companies retain ownership of site lights and charge monthly rent for them. If a utility company owns the light, have them replace it.



Figure 10—This parking lot light pole has a distinct lean and minor rot at the base. The light fixture lens is cracked. The fixture and pole should be replaced.

Work Item 03001—Concrete Slab or Stem Wall, Minor Repair, Spalls & Cracks

Definition: Repair concrete stem walls, retaining walls (figure 11), slabs (figure 12), etc.

Typical Life Cycle: 15 years.

- Concrete slabs and stem walls last indefinitely unless adversely affected by soil movement, overloading, or poor initial construction (inadequate base, poor-quality concrete, overworked finish, inadequate control joints, etc.). Typical “wearing-out” life cycles don’t usually drive the need to repair concrete on buildings.

Unit of Measure: square feet (SF).

- Calculate the square feet of the concrete slab or wall that needs work.

Considerations:

- Includes extensive nonstructural repairs or sealing cracks and spalls on formed concrete and concrete masonry units that are part of a building, including entry sidewalks, ramps, and cracked slabs in open buildings, such as carports or picnic shelters.
- Does not include major overlay, repair, or replacement because of failure of the wall or slab. Does not include stone or brick masonry work. Use a custom item for such work.



Figure 11—This wall remains sturdy, but the surface layer of the concrete is peeling off. The surface layer should be removed and refinished.

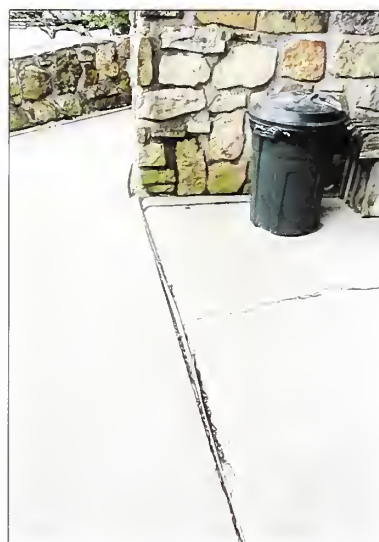


Figure 12—This concrete slab is cracked and is spalled at the edge of the control joint. The deficiencies should be repaired.

Work Item 04001—Basic Roof, Fiberglass Shingles, Removal/Replacement

Definition: Remove and replace standard-quality, moderate-cost roofing (figures 13 and 14).

Typical Life Cycle: 20 years.

Unit of Measure: square (SQ) of roofing.

- A square of roofing covers about 100 square feet.
- Calculate the square feet of roof **on the slope** and divide by 100; round **up** to the nearest square.

Considerations:

- Includes standard-cost asphalt or fiberglass shingles (30-year shingle or less); V-crimp metal roofing; delta-rib, exposed-fastener metal roofing; asphalt-roll roofing; or other moderate-cost roof materials that typically have about a 20-year life cycle.
- Includes setting up, securing, and taking down the ladder; removing existing roofing; removing damaged metal flashing; installing 15-pound roofing felt; installing new aluminum flashing; installing roofing; and cleaning up.
- Does not include repair work; fixing isolated leaks is operations or minor maintenance work that needs to be completed as soon as possible.
- Does not include replacing sheathing or vents, other than integral ridge vents.

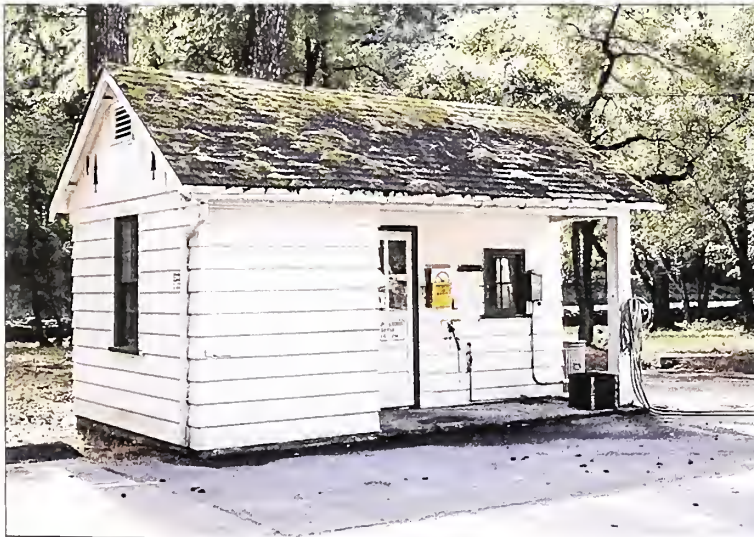


Figure 13—Timely operations and maintenance work, especially moss and debris removal, could have extended the life of this roof. The roofing has deteriorated to the point that it should be replaced.



Figure 14—This roof has many patches of missing shingles and the remaining shingles are in poor condition. The roof probably leaks in several places. The shingles should be replaced.

Work Item 04002—Premium Roof, Metal/Membrane/Shakes, Removal and Replacement

Definition: Remove and replace premium-quality roofing (figures 15 and 16).

Typical Life Cycle: membrane—20 years; wood, tile, or architectural-grade shingles—30 years; standing-seam metal—50 years.

Unit of Measure: square (SQ) of roofing.

- A square of roofing covers about 100 square feet.
- Calculate the square feet of roof **on the slope** and divide by 100; round **up** to the nearest square.

Considerations:

- Includes replacing wood shakes or shingles; tile roofing; standing-seam metal roofing; slate-, shingle-, or tile-patterned metal roofing; single-ply membrane roofing; architectural-grade composition shingles; and other

premium-quality roofing.

- Includes setting up, securing, and taking down the ladder; removing existing roofing; removing flashing metal; installing new flashing; installing a new roof system, including felt or an underlayer; and cleaning up.
- Because removing and reinstalling rooftop equipment, such as condensing units, is often required, a crane might be needed to remove and reinstall equipment. The cost of this work is reflected in this standard work item.
- Does not include replacing nonfunctioning or inadequate roof-mounted equipment or vents. Use a custom item for such work if the work is a major expense.
- Does not include repair work; fixing isolated leaks is operations or minor maintenance work that needs to be completed as soon as possible.

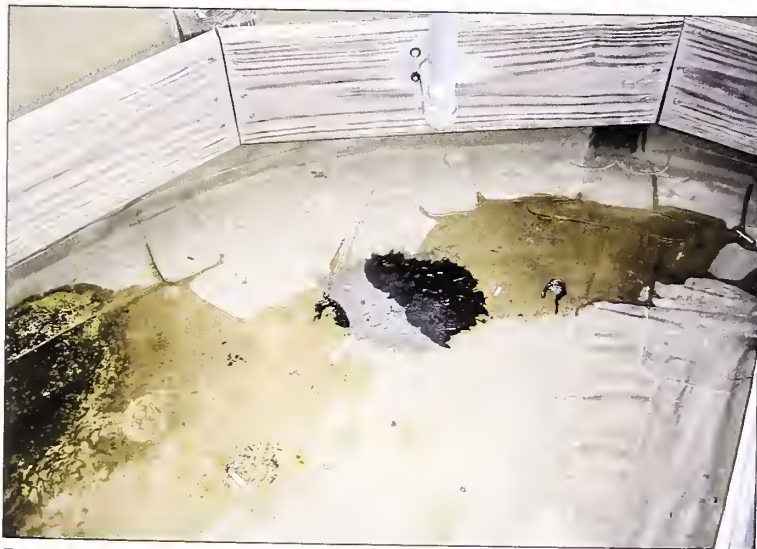


Figure 15—This roof membrane has been patched so many times that it should be replaced the next time it springs a leak.



Figure 16—This standing-seam roofing is rusting and has come apart in several places, including at one seam that has been “fixed” with caulking. The roofing should be replaced.

Work Item 04003—Skylight, Remove/Replace

Definition: Remove and replace a typical, unvented, nonopening skylight (figure 17).

Typical Life Cycle: 30 years.

Unit of Measure: each (EA).

Considerations:

- Includes removing and replacing bubble-type or similar skylights that are broken, brittle, or no longer transmit daylight.

- Includes setting up and securing the scaffold, removing the skylight, removing flashing, installing new flashing, installing the new skylight, and removing scaffold.
- Skylight leaks usually come from wornout or improperly installed flashing. They may leak through the frame if the frame has separated. Skylights seldom leak through the glass or plastic unless a crack or break is visible.
- Do not reuse the existing flashing.
- It may be necessary to replace some of the roofing immediately surrounding the skylight to properly install new flashing; such work is included in this item.



Figure 17—This building has typical bubble-type skylights. This skylight probably leaks during windblown, heavy rain because of the separated flashing at the lower end. Carefully evaluate whether to replace the skylight or just repair the flashing and roofing.

Work Item 04004—Gutters/Downspouts, Remove/Replace

Definition: Remove and replace downspouts (figure 18) and gutters (figure 19).

Typical Life Cycle: 15 years.

Unit of Measure: linear feet (LF).

- Measure the length of both gutters and downspouts, including downspout returns, and add all segments for total linear feet.

Considerations:

- Unless downspouts are directly piped into an underground stormwater system, include minimum 3-foot downspout returns to carry water away from the building (even if the existing downspouts don't have returns).



Figure 18—This downspout is crushed and plugged and should be replaced.



Figure 19—An ice dam overloaded this gutter. The outside edge of the gutter is detached from the clip supports and is bent out and down. The end seams have burst. This gutter should be replaced.

Work Item 05001—Steps, Exterior, Remove/Replace

Definition: Remove and replace exterior steps made from concrete (figure 20), wood, or other materials.

Typical Life Cycle: 20 years.

Unit of Measure: step, each (STEP, EA).

- Count the stair risers to determine the number of steps. For example, the photo shows three risers, for a count of “3 EA.”

Considerations:

- Includes replacing exterior steps from 2 to 12 feet high that are deteriorated or don't meet code requirements for existing buildings.
- Does not include tread resurfacing, painting, etc., which are operations or minor maintenance expenses.
- Does not include replacing railings. Use work item 05003 for railings.
- Does not include replacing the porch, deck, or stoop. Use work item 05002 for a wood deck or porch or a custom item for a concrete porch or stoop.



Figure 20—These deteriorated concrete steps are a tripping hazard and should be replaced.

Work Item 05002—Wood Decks, Removal/Replace

Definition: Remove and replace a deteriorated wood (figure 21) or plastic composite deck or porch.

Typical Life Cycle: 20 years.

- If the ultraviolet-resistant finish on wood decks is reapplied as needed, the boards should last about 20 years. If not, they may last no more than 10 to 15 years.

Unit of Measure: square feet (SF).

- Calculate the total square feet of deck that needs to be replaced.

Considerations:

- Includes replacing wood decking, stringers, the substructure, and the foundation.
- Does not include railings. Use work item 05003 for railings.
- Does not include washing, sealing, or waterproofing, which are operations or minor maintenance expenses.



Figure 21—The decking on this porch is badly deteriorated. Most of the boards are buckled and several are missing. The decking should be replaced. The joists supporting the deck are probably also rotten and should be replaced.

Work Item 05003—Railing, Porch & Deck, Remove/Replace

Definition: Remove and replace standard-quality exterior guard-rail (figures 22 and 23) and handrail around porches and decks and along steps and ramps.

Typical Life Cycle: 20 years.

Unit of Measure: linear feet (LF).

- Measure the total length in feet of railing to be replaced.

Considerations:

- Includes porch, deck, and stairway rails that are deteriorated or don't meet code requirements for the intended use of the structure.
- Includes all usual materials, including dimensioned lumber, plastic composites, and metal.
- Includes replacing a complete railing system 36 to 42 inches high, including guardrails and the required scaffolding to accomplish the task.



Figure 22—This guardrail is in worse condition than is evident in a photo of this size. Aside from the missing boards, many of the bottom rails and posts are not attached to the structure, many of the boards are rotted nearly through, fruiting fungi are growing on many of the boards and posts, and some of the wire panels are held in place with zip ties. The guardrail needs to be completely replaced.

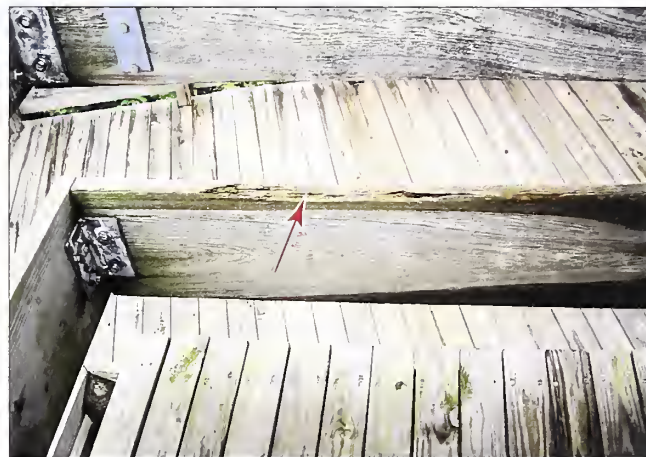


Figure 23—This guardrail board on an overlook tower is rotten. If it's the only rotten board, replacement is considered operations work that should be completed as soon as possible. If most of the boards are rotten, the entire guardrail should be recorded under item 05003 and replaced.

Work Item 06001—Siding, All Types, Remove/Replace

Definition: Remove and replace siding (figures 24 and 25).

Typical Life Cycle: 25 years.

Unit of Measure: 100 square feet (CSF).

- Calculate the square feet of all siding areas to be replaced, then divide by 100.
- Do not deduct for door and window openings.

Considerations:

- Includes removing all types of siding (cement board, wood, EIFS, plywood, aluminum, vinyl, hardboard, etc.) and replacing it with the Forest Service standard: fiber cement board or similar. Includes eaves, trim, fascia, and proper flashing around windows and doors.
- Includes setting up, securing, and taking down the ladder. Includes painting the new siding.



Figure 24—This is not the original siding, and it's in poor condition. Most siding boards are damaged and some siding is missing near the door where knee braces for an entrance hood were removed. This replacement siding should be replaced.



Figure 25—This shingle siding is worse in some places than in others, but all the siding is weather damaged and brittle and should be replaced.

Work Item 06002—Door, Exterior, Remove/Replace

Definition: Remove and replace an exterior pedestrian door (figures 26 and 27).

Typical Life Cycle: 20 years.

Unit of Measure: each (EA).

- “Each” means each door. Double doors are counted as 2 EA. An entry with both a door and a screen door is counted as 2 EA if both need to be replaced.

Considerations:

- Includes replacing pedestrian doors up to 4 feet wide and 8 feet tall (any material—wood, aluminum, steel, etc.), insulated vision pane glass (if any), doorframes, closers, and all commercial hardware and locksets.
- Does not include metal-framed glass storefront-type door surrounds, only the door. Use item 07006 for windows not included within doors.
- Does not include custom replication of fancy historic door styles. Use a custom item for such work.



Figure 26—The broken-out glass could be replaced, but the delaminating panels on this door can't be repaired without expert restoration skills. Preservation requirements determine whether this historic building's door should be replaced in kind or restored.

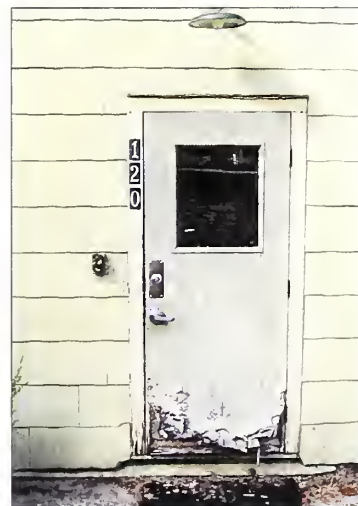


Figure 27—This door looks like an interior door that was mistakenly installed on an exterior wall. It is badly deteriorated and should be replaced with an exterior door.

Work Item 06003—Door, Garage, Overhead Door

Definition: Remove and replace overhead doors (figures 28 and 29).

Typical Life Cycle: 20 years.

Unit of Measure: each (EA).

Considerations:

- Includes removing and disposing of doors up to 16 feet wide and 9 feet high that are broken, rotten, or nonfunctional, including old swinging or sliding doors that need to be replaced with modern overhead doors.
- Includes all door materials (wood, steel, fiberglass, etc.) along with any vision panes, rollers, springs, and hardware.
- Does not include replacing swinging or sliding historic garage or warehouse doors in kind. Use a custom item to replace historic doors in kind.



Figure 28—This overhead warehouse door is damaged. Because several layers of plywood were peeled off the panel, the strength of the door is compromised. The door should be replaced.



Figure 29—This residential garage door is warped and does not open properly. The door should be replaced.

Work Item 06004—Painting, Exterior, Includes Prep, Prime and Paint

Definition: Repaint the exterior of a building, including preparation and prime coat (figures 30 and 31).

Typical Life Cycle: 5 years.

- Typical life cycle is for paint on wood siding and trim. Some other finishes, such as paint on cement composite siding or semitransparent stain on wood siding, may last longer.

Unit of Measure: square feet (SF).

- Calculate the gross square feet of the surface area to be painted. Do not deduct openings, such as doors and windows.

Considerations:

Includes surface preparation, caulking (if needed), a full or spot prime coat (as needed), and painting or staining of all exterior surfaces, including trim, with latex paint or water-based stain.

- Use this item regardless of how many coats of paint are actually needed, the type of paint (oil base, latex, stain, etc.), or the type of siding being painted.
- Does not include lead paint removal. Use work item 16001 for removing lead paint.



Figure 30—Although the paint is peeling badly, the wood siding of this historic building is in decent condition. New paint will keep the siding serviceable. Because it's a historic building, old layers of paint may contain lead, requiring special preparation (see work item 16001). Follow the building preservation plan and use historic colors when repainting.



Figure 31—The T1-11 siding should be cleaned and restained with a semitransparent penetrating stain. Loose paint should be scraped or sanded from the window frame and trim before they are primed and repainted.

Work Item 07001—Doors, Interior, Remove/Replace

Definition: Remove and replace an interior door (figure 32).

Typical Life Cycle: 30 years.

Unit of Measure: each (EA).

- “Each” means each door. Double doors are counted as 2 EA.

Considerations:

- Includes replacing wornout, damaged, or nonfunctioning interior doors up to 4 feet wide and 8 feet tall, whether solid or hollow core; wood, steel, fiberglass, or other standard-grade material; casing; and hardware of all types.
- Includes removing the old doors, doorframes, hardware, and door closers (if any); installing new doorframes, hinges, vision panes (if any), and doors; and replacing or reinstalling the door casing, closers, and latches.
- Does not include luxury-grade doors or custom replication of fancy historic door styles. Use a custom item for such work.



Figure 32—This interior door is delaminated at the top and should be replaced. Although only the door should be replaced (not the frame or hardware), use item 07001 and its standard cost. To improve accessibility, the knob should be replaced with a lever-type handle.

Work Item 07002—Toilet Partitions, Per Stall, Remove/Replace

Definition: Remove and replace a toilet partition (figure 33) or urinal screen (figure 34).

Typical Life Cycle: 20 years.

- Partitions often need to be replaced because of vandalism or abuse rather than for exceeding their expected life.

Unit of Measure: each (EA).

- Count each complete stall or each urinal screen as 1 EA.

Considerations:

- Includes removing and replacing all types and sizes of partitions and doors, all types of hardware and mounting systems, and cleaning up.
- Replacement partitions should be the Forest Service standard—solid phenolic resin. Because of durability and graffiti concerns, do not install wood or painted metal partitions in locations used by the public.



Figure 33—Although the obvious problem is the mismatched plywood stall door, all these partitions and doors are constructed of aging plastic laminated to pressed board. The edges of the partitions and doors are chipped, some are delaminating in places, and some are warped. The doors and partitions should be replaced.



Figure 34—This urinal screen began to rust after the painted finish became scratched and chipped. The screen should be replaced.

Work Item 07003—Drywall, Install & Taped, Remove/Replace

Definition: Remove and replace gypsum wallboard (figures 35 and 36).

Typical Life Cycle: 75 years.

- Replacement is usually needed because of water damage, vandalism, or abuse and is not typically related to the expected life of the product.

Unit of Measure: square feet (SF).

Measure the replacement area to the center of the next nearest support (stud, joist, etc.), because replacement material must be fastened to a support. Calculate the total square feet to be replaced.

Considerations:

- Includes taping and texturing ½- or ⅝-inch-thick type X gypsum wallboard (also called drywall, plasterboard, or Sheetrock).
- Includes removing other wall surfacing, such as plywood or pressed-board paneling, and replacing it with gypsum wallboard.
- Does not include painting. Use work item 09001 for painting.
- Does not include in-kind replacement of plaster, premium wood paneling, or other high-end wall surfaces. Use a custom item for such work.



Figure 35—Water damage from a leaking roof ruined this gypsum wallboard ceiling. The paint is probably the only thing keeping the ceiling in place, because exposure to water degrades the structural integrity of ordinary gypsum wallboard. After the roof is repaired, the gypsum wallboard ceiling should be replaced. See item 16002—Environmental Mitigation, if there is mold.



Figure 36—Water damage from a burst pipe during the off-season caused a flood in this crew-quarters building that damaged the bottom of all the kitchen walls. The damaged gypsum wallboard should be replaced.

Work Item 07004—Cabinets, Kitchen, Remove/Replace

Definition: Remove and replace built-in cabinetry and countertops (figure 37).

Typical Life Cycle: 30 years.

Unit of Measure: linear feet (LF).

- Measure linear feet along the wall from one end of the cabinets to the other end.
- All cabinets along the same wall are measured together for this work item. The cost per linear foot includes base cabinets and wall cabinets or either of these components alone. For example, if only upper cabinets will be replaced, enter the total length of the upper cabinets under this work item. Do not reduce the length entered because the base cabinets will not be replaced.

Considerations:

- Includes removing and replacing all types of wornout, broken, or nonfunctioning cabinets, except laboratory cabinets, in all locations. Use item 07005 for laboratory cabinets.
- Includes countertops, base cabinets, wall cabinets, hinges, and pulls.
- Does not include cabinet repair or refinishing, which could be operations or minor maintenance work or a custom work item if the expense is significant.



Figure 37—Although the doors are crooked and the drawers don't slide easily, these cabinets are still functional. Because they are sturdier than most modern cabinets, it may be better to fix than to replace them, especially if they have historic significance.

Work Item 07005—Cabinets, Laboratory, Remove/Replace

Definition: Remove and replace built-in laboratory cabinetry and countertops (figures 38 and 39).

Typical Life Cycle: 40 years.

Unit of Measure: linear feet (LF).

- Measure linear feet along the wall from one end of the cabinets to the other end.
- All cabinets along the same wall are measured together for this work item. The cost per linear foot includes base cabinets and wall cabinets or either of these components alone. For example, if only base cabinets will be replaced, enter the total length of the base cabinets under this work item. Do not reduce the length entered because wall-hung upper cabinets are not needed.

Considerations:

- Includes removing and replacing wornout, broken, or nonfunctioning chemical-resistant countertops, base cabinets, and wall cabinets.
- Does not include cabinet repair or refinishing, which could be operations or minor maintenance work, or a custom item if the expense is significant.



Figure 38—This old lab cabinet has remained in use for more than 50 years, and it shows. Rust and pitting are extensive. The cabinet should be replaced.



Figure 39—This wooden lab cabinet and countertop look as though they are in poor condition. They should be thoroughly cleaned and refinished. They still function well.

Work Item 07006—Window, Remove/Replace

Definition: Remove and replace a window (figure 40).

Typical Life Cycle: 30 years.

Unit of Measure: each (EA).

- Count each window unit as 1 EA. Window units are separated by a section of wall or by a vertical support mullion, as shown in figure 41. The paired components of sliding or double-hung windows are counted as one window unit.

Considerations:

- Includes removing and replacing existing windows with new windows that meet the Forest Service standard (good quality, thermally efficient). Includes all materials, equipment, and scaffolding required to complete the work, including replacing or repairing trim.

- Includes replacing windows that should be tempered but often aren't, such as windows near doors and stairways or within 18 inches of the floor.
- Includes replacing single-pane windows with new windows to increase energy efficiency.
- Does not include storefront windows (large expanses of glass typically surrounding an entry door), which are custom work.
- Does not include window repair (an operations or maintenance expense) or rebuilding historic windows (a custom item).
- Caution: for buildings that are eligible for or listed on the National Register of Historic Places, it is often better to rebuild and/or add storm windows rather than replacing original windows. Such work is a custom item.



Figure 40—It's difficult to tell in this photo, but the steel frame of this window isn't in any better condition than the cracked windowpanes. The frame is warped, rusted in places, and partially missing. The window should be replaced.



Figure 41—This photo shows nine windows separated by support mullions and a door with three vision panes. Each window has four windowpanes (lites). If you had to replace them all, you would count nine each of work item 07006 (windows) and one each of work item 06002 (exterior door).

Work Item 08001—Stairs, Interior, Remove/Replace

Definition: Remove and replace interior stairs (figure 42).

Typical Life Cycle: 40 years.

Unit of Measure: step, each (STEP, EA).

- Count the stair risers to determine the number of steps.

Considerations:

- Includes removing and replacing a complete flight of interior stairs (including pull-down units) up to 42 inches wide, constructed of any standard material, that are deteriorated or don't meet code requirements for existing buildings.
- Does not include replacing carpeting or other flooring for the stairs or replacing railings. Use work items 09002, 09003, 09004, 09005, and 08002 for such work.
- Does not include replacing flights of stairs more than 42 inches wide (a custom item) or replacing one or two treads, which is an operations or minor maintenance expense.

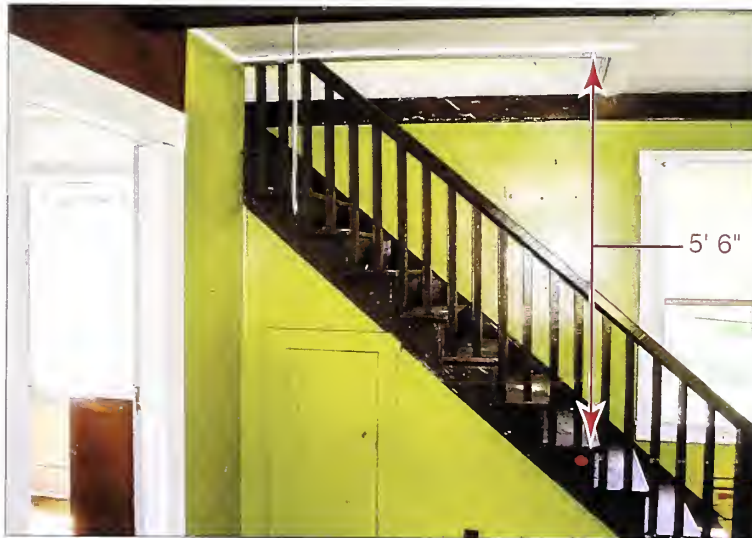


Figure 42—The stairway of this early 20th century log house should be replaced because it is unsafe and doesn't comply with building codes for existing buildings. The stairway doesn't have enough head clearance and the steps are too steep.

Work Item 08002—Railing, Stair, Guards and Handrails, Remove/Replace

Definition: Remove and replace interior handrails and guardrails (figure 43).

Typical Life Cycle: 45 years.

Unit of Measure: linear feet (LF).

- Measure the handrail and guardrail separately if they are not integrated and both need to be replaced. Add the linear feet of the handrail and the linear feet of the guardrail to get the total linear feet.

Considerations:

- Includes removing and replacing nonfunctional, wornout, or non-code-compliant handrails and guardrails constructed of any common building material.

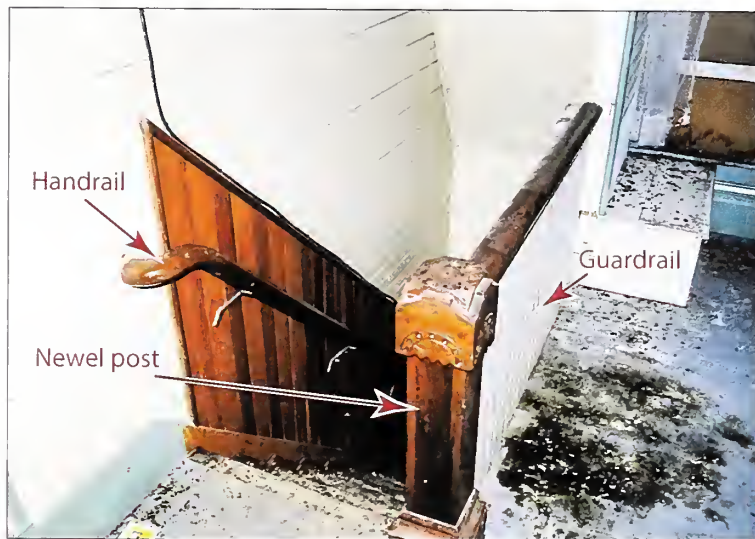


Figure 43—This handrail is in good condition. It should be raised so that it is 34 to 38 inches above the noses of the steps. The guardrail should be rebuilt so that the top of the rail is 42 inches above the floor. Because this structure is historic, the top rail, newel cap, and newel base should be refinished and mounted atop longer balusters and a newel post that have the same horizontal dimensions and appearance as the originals.

Work Item 09001—Painting, Interior Walls and Ceiling, Includes Prep, Prime and One Coat Latex

Definition: Prepare and paint interior walls, the ceiling, and trim with prime and topcoat (figure 44).

Typical Life Cycle: 5 years.

Unit of Measure: square feet (SF).

- Calculate the total square feet to be refinished. Do not deduct for openings.

Considerations:

- Includes repainting any common wall or ceiling surface, such as gypsum wallboard, plaster, and pressed board.
- Includes masking and providing floor protection; cleaning and preparing the surface; priming or sealing; painting interior walls, ceiling, and trim; and removing masking and drop cloths.
- Does not include removing lead-based paint. Use work item 16001 for removing lead-based paint.



Figure 44—The walls and ceiling of this second floor room already are sanded in preparation for a badly needed repainting. The varying depth of sanding indicates the paint was in very poor condition.

Work Item 09002—Flooring, Carpet, Repair/Replacement

Definition: Remove and replace standard-quality carpet and padding (figure 45).

Typical Life Cycle: 8 years.

Unit of Measure: square feet (SF).

- Calculate the square feet of carpet to be replaced. Unless carpet is unitized (carpet “tiles”), extend the replacement area to a logical joint, such as under a door. Do not “patch” sheet carpet in the middle of a room.

Considerations:

- Includes removing damaged carpet and installing new carpet and pad.
- Includes moving furniture out of the room (if the room is furnished) and moving it back in.
- If the carpet is not badly worn or damaged, consider cleaning it instead of replacing it. Cleaning would be considered an operations cost.
- Consider replacing sheet carpet with carpet tiles to make it easier to remove and replace damaged sections, add floor outlets, etc.



Figure 45—This carpet has exceeded its useful life and should be replaced. The pile is completely worn away in some areas, the seam is raveling, and the staining is severe.

Work Item 09003—Flooring, Tile, Remove/Replace

Definition: Remove and replace wood, laminate, ceramic, or quarry floor or wall tiles or boards (figures 46 and 47).

Typical Life Cycle: 30 years.

Unit of Measure: square feet (SF).

- Calculate the square feet of flooring to be replaced.
 - » If the material can be matched exactly, replace only the area that is damaged.
 - » If the material cannot be matched exactly, extend the replacement area to a logical joint, such as under a door. Do not install a mismatched “patch” in the middle of a room.

Considerations:

- Includes removing and replacing damaged or excessively worn ceramic, quarry, wood, or laminate wall tiles, floor tiles, or flooring boards. Includes surface preparation.
- Does not include refinishing existing wood flooring. Use work item 09004 for refinishing.
- Does not include vinyl or other composition flooring tiles. Use work item 09005 for vinyl or composition flooring.
- Does not include replacing underlayment, subfloor, or floor joists. Such work is a custom item.

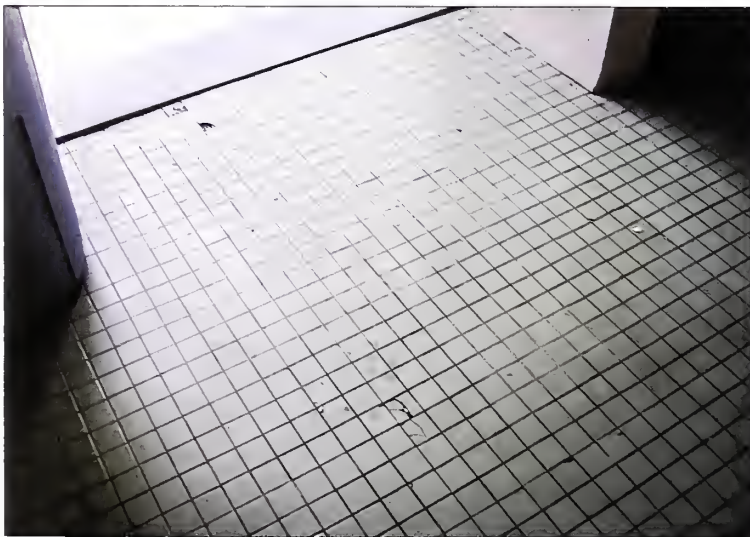


Figure 46—Many of the individual tiles in this floor are chipped or cracked. If it is impossible to find matching tiles to individually replace the bad tiles, the entire floor surface should be replaced.



Figure 47—The wood flooring of this lookout cabin is warped and pieces are missing. The flooring should be completely replaced before the building is returned to use.

Work Item 09004—Flooring, Wood, Sand and Refinish

Definition: Sand and refinish wood plank or tongue and groove flooring (figure 48).

Typical Life Cycle: 10 years.

Unit of Measure: square feet (SF) of flooring to be refinished.

- Calculate the square feet of the entire room. It's not possible to satisfactorily refinish only a portion of a room's wood floor.

Considerations:

- Includes removing any remaining old finish and applying new stain and a wear layer, as appropriate.
- Does not include replacing wood flooring. Use work item 09003 for wood flooring.



Figure 48—The finish of this wood floor is completely worn off in some areas. The entire floor should be sanded and refinished.

Work Item 09005—Flooring, Vinyl, Remove/Replace

Definition: Remove and replace vinyl or other composition flooring, either sheet (figure 49) or tile.

Typical Life Cycle: 18 years.

Unit of Measure: square feet (SF).

- Calculate the square feet of flooring to be replaced.
 - » If the material can be matched exactly, measure the area that is damaged to the nearest pattern line that will camouflage the patch.
 - » If the material cannot be matched exactly, measure the replacement area to a logical joint, such as under a door. Do not install a mismatched “patch” in the middle of a room.

Considerations:

- Includes removing damaged flooring, preparing the surface, and installing new vinyl flooring.
- Does not include removing flooring that contains asbestos. Asbestos tiles typically are 9 by 9 inches. Test if uncertain. Use work item 16001 for removing asbestos.

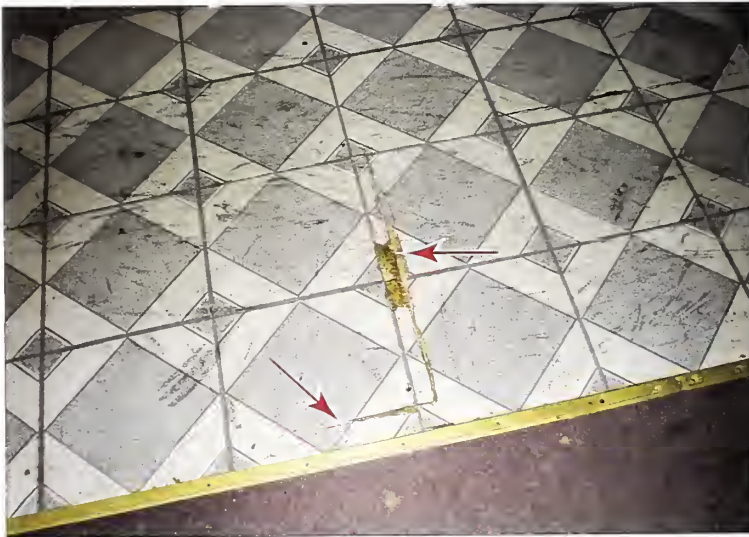


Figure 49—The wearing surface and color layer of this vinyl flooring are completely scraped off in places. This damage cannot be repaired. The flooring should be replaced.

Work Item 09006—Ceiling, Acoustic, Remove/Replace

Definition: Remove and replace acoustic ceiling tiles and the support grid (figure 50).

Typical Life Cycle: 20 years.

- Failure more typically results from water damage than wearing out.

Unit of Measure: 100 square feet (CSF).

- Calculate the square feet of the ceiling and divide by 100, then round up to the nearest whole number.
- Unless you can match the material exactly, replace the ceiling of the entire room.

Considerations:

- Includes setting up, securing, and taking down scaffold; removing old ceiling tiles; removing the old ceiling grid; installing the new ceiling grid; installing new ceiling tiles; resetting existing light fixtures, diffusers, grills, etc.; and sweeping and cleaning debris.
- Does not include replacing light fixtures, diffusers, or grills. Use work item 13004 for light fixtures. Replacing diffusers or grills can be operations, minor maintenance, or a custom item, depending on the extent and expense of the work.
- Does not include replacing a couple of individual tiles in a room. Such work is operations or minor maintenance.



Figure 50—This ceiling has suffered repeated water damage. Previous stains were covered with spray paint. Darker areas of the ceiling are currently wet. The corners of some of the panels are coming apart and the grid is beginning to rust (circled). The panels should be replaced before they lose structural integrity and fall down. Roof leaks should be corrected before the ceiling is replaced. See item 16002—Environmental Mitigation, if there is mold.

Work Item 10001—Toilet/Urinal Fixture, Remove/Replace

Definition: Remove and replace a toilet (figure 51) or urinal, including flush valves.

Typical Life Cycle: 35 years.

Unit of Measure: each (EA).

Considerations:

- Includes turning shutoff valves off and on, removing fixtures, installing new wall- or floor-mounted fixtures (including wax rings and other connectors), installing flush valves and pipes, and checking operation. For public restrooms, use elongated toilet bowls (not round) with open-front seats.

- Includes replacing an old fixture to provide accessibility for employees and the public. Refer to the Architectural Barriers Act (ABA) Accessibility Standards at <<http://www.access-board.gov/>> for requirements.
- Includes replacing old fixtures to reduce water use. Refer to <http://fsweb.wo.fs.fed.us/eng/programs/facilities/sus_green/fix_pro.htm> for new fixture testing and performance information.
- Does not include replacing grab bars or toilet seats, which usually are operations or minor maintenance work.
- Does not include replacing a flush valve only, which is an operations or minor maintenance expense. Life expectancy for a flush valve is 10 years.



Figure 51—This toilet from the 1930s still works, but it uses about 8 gallons of water per flush. Consider historic preservation and accessibility requirements as well as water efficiency before deciding whether to replace or modify historic fixtures in historic buildings. Consult a mechanical engineer to learn whether a historic fixture can be modified to use less water.

Work Item 10002—Lavatory Fixture, Remove/Replace

Definition: Remove and replace a sink, including faucets and drain (figures 52 and 53).

Typical Life Cycle: 35 years.

Unit of Measure: each (EA).

Considerations:

- Includes bathroom (lavatory) sinks, laundry room sinks, nonfreestanding single- and double-bowl kitchen sinks, and other similar sinks.
- Includes shutting off water (hot and cold); disconnecting and removing sinks; and installing new sinks, faucets, drains, and tubing.
- Does not include oversize freestanding sinks or laboratory sinks, which are custom work items.
- Includes replacing sinks to provide accessibility for office or crew-quarters restrooms or kitchens. Refer to the ABA Accessibility Standards at <http://www.access-board.gov/> for requirements.



Figure 52—This combination lavatory and countertop is broken (circled) and should be replaced.



Figure 53—Although it has two bowls, this double kitchen sink would count as "1 each." A larger problem needs to be addressed, however: the water is apparently nonpotable and not suitable for washing the dishes that are stacked in the sink. To prevent illness, water to the sink should be shut off until the water system is restored to potability.

Work Item 10003—Tub/Shower Complete, Remove/Replace

Definition: Remove and replace a bathtub or shower, including spout, faucet(s), and showerhead (figure 54).

Typical Life Cycle: 25 years.

Unit of Measure: each (EA).

Considerations:

- Includes removing and replacing a tub, shower, or combo unit, whether porcelain, tile, fiberglass, or other material.
- Includes removing shower enclosures; installing new shower enclosures; and installing new showerheads, arms, faucets and drains, and valves.
- Includes replacing showers or tubs to provide accessibility in offices, fire stations, or crew quarters. Refer to the ABA Accessibility Standards at <<http://www.access-board.gov/>> for requirements.
- Does not include extensive reframing necessitated by severe deterioration. Use a custom item for reframing.



Figure 54—These old metal shower stalls are rusted, allowing water to escape from the walls and pans of the stalls. The stalls should be replaced.

Work Item 10004—Drinking Fountain, Remove/Replace

Definition: Remove and replace a drinking fountain (figure 55).

Typical Life Cycle: 18 years.

Unit of Measure: each (EA).

Considerations:

- Includes removing and replacing the complete old drinking fountain or water cooler and installing a new water cooler unit. Don't save or reuse an old refrigerated drinking fountain.
- Includes replacing water coolers or drinking fountains because of compressor failure or to provide accessibility (figure 56). Refer to the ABA Accessibility Standards at <http://www.access-board.gov/> for requirements.



Figure 55—This is a very bad location for a drinking fountain. The fountain must be outside the 36-inch clear area for the electrical panel and should ideally be several feet away. The fountain should be removed. It doesn't meet accessibility requirements. If a drinking fountain is needed, install a new, accessible fountain at a different location.

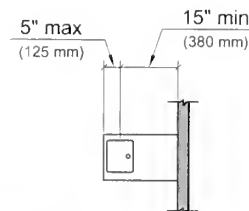
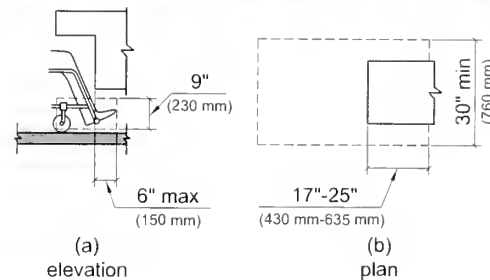


Figure 56—These drawings show some of the clearance and size requirements for accessible drinking fountains. Refer to the Architectural Barriers Act Accessibility Standards for more information about accessibility requirements.

Work Item 10005—Eye Wash, Remove/Replace

Definition: Remove and replace an eyewash station (figures 57 and 58).

Typical Life Cycle: 25 years.

Unit of Measure: each (EA).

Considerations:

- Includes removing and replacing eye wash stations that are wornout, damaged, dysfunctional, or that cannot be sanitized.
- Test existing units during the condition assessment inspection to ensure that they are functional and easy to access.



Figure 57—This eyewash station is too dirty to ensure a rinse with uncontaminated water. If a thorough cleaning isn't sufficient to return it to a sanitary condition, it should be replaced.

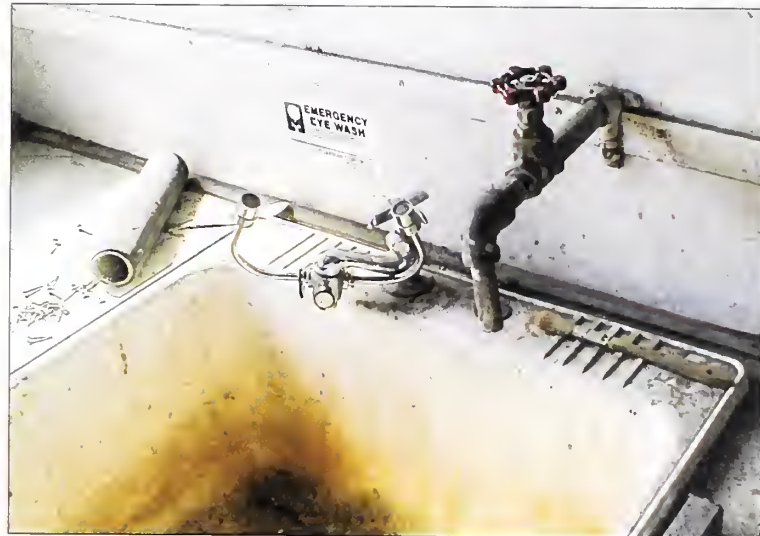


Figure 58—The lack of protective covers and an easy-to-operate activator make this eyewash station unsuitable for use. It clearly should be replaced.

Work Item 10006—Water Heater, Remove/Replace

Definition: Remove and replace an electric or gas water heater (figure 59) or small boiler (figure 60).

Typical Life Cycle: 15 years.

Unit of Measure: each (EA).

Considerations:

- Includes completely removing and replacing commercial water heaters (propane, natural gas, or electric) or small boilers up to about 150,000 British thermal units (Btu) per hour, including valves, venting, etc.
 - » Includes an anti-scald device and a pop-off valve with a discharge pipe plumbed to a floor drain or to the outside.
 - » Includes seismic restraints, as required locally.
 - » Includes installing to code standards, including piping, clearances, and elevation of the heater 18 inches above the floor if it's in a garage or shop.
 - » Includes checking operation after installation.
- Includes replacing water heaters to improve energy efficiency—older units typically are 60-percent efficient, while new condensing units are 90-percent efficient or more.



Figure 59—This old tank held water that was heated by coils inside a wood heat or cook stove that was removed. The tank should be replaced if hot water is still needed at this location.

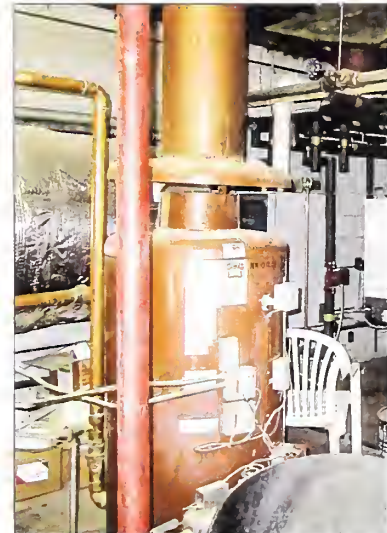


Figure 60—This old boiler may work, but it probably runs inefficiently, and the exposed wiring connections are not safe. It should be replaced.

Work Item 10007—Gas/LP Yard Line, Remove/Replace

Definition: Remove and replace underground natural gas, propane (figure 61), or fuel oil piping.

Typical Life Cycle: 30 years.

Unit of Measure: linear feet (LF).

- Measure and include the vertical portions of the line at the tank and up the outside of the building, as well as the horizontal line.

Considerations:

- Includes completely replacing a rusted, corroded, deformed, or leaking gas or oil underground service line.
 - » Includes piping and fittings, as well as trenching and backfill to the building, from either an above-ground or buried tank.

- » Includes replacing hard or soft copper, black iron, or polyethylene lines with code-compliant, properly sized materials.
- » Includes obtaining a permit, where required.
- » Includes checking for breaks or leaks before removing the old line and checking for leaks after installing the new line.
- Check with the local fuel supplier; they may be responsible for part of the work.
- Ensure that the tank is the proper distance from the building and openings. Refer to <<http://www.propane101.com/propanetankdistancerules.htm>>.
- Use detergent in water to check for leaks on exposed parts. Refer to <<http://www.propane101.com/checkingforgasleaks.htm>>.



Figure 61—What's underground between the propane tank and the building? The consequences can be severe if the line is defective. Defective lines should be replaced immediately.

Work Item 11001—Pump, Circulation, Water or HVAC, Remove/Replace

Definition: Remove and replace a booster, vacuum, or circulation pump (figure 62), including mounts, connections, and controls.

Typical Life Cycle: 20 years.

Unit of Measure: each (EA).

Considerations:

- Includes circulation pumps, booster pumps, and vacuum pumps up to about 3 horsepower, including controls.
- Includes needed upgrades of support, vibration mounts, isolation valves, flexible connections, disconnects, and similar items to ensure efficient operation.
- Includes removing flanged connection pumps, replacing pumps and motor assemblies, and installing new flanged connection pumps.
- Does not include potable water, irrigation, or wastewater pumps in pump/control houses or outside. Such pumps are covered under water and wastewater maintenance or improvement.



Figure 62—The motor on this pump looks newer than the pump and fittings. The extent of rust and the pump's marginal performance indicate that the pump and fittings should be replaced.

Work Item 11002—Boiler, Remove/Replace

Definition: Remove and replace a large boiler that uses any fuel (figure 63).

Typical Life Cycle: 30 years.

Unit of Measure: each (EA).

Considerations:

- Includes boilers from about 150,000 Btu per hour up to about 2 million Btu per hour, including connections and fittings.
- Old boilers may be cast iron, steel, copper fin, or condensing type.
- Includes replacing boilers to improve energy efficiency.



Figure 63—This relatively new and efficient 1-million-Btu boiler is about one-fourth the size of an older, equal-capacity boiler. This boiler is only about 10 years old and is in good condition.

Work Item 11003—Cooling Tower, Remove/Replace—Average 50 Ton

Definition: Remove and replace a cooling tower and its appurtenances (figure 64).

Typical Life Cycle: 15 years.

Unit of Measure: each (EA).

Considerations:

- Includes completely removing and replacing wornout cooling towers and appurtenances. Unit cost is based on a 50- to 100-ton cooling tower.
- Includes towers located indoors in a mechanical room or outdoors on a roof or in a separate tower.
- Cooling towers typically are used in conjunction with water-cooled chillers (work item 11004).



Figure 64—This indoor cooling tower was installed in 1962 and is still operating satisfactorily more than 50 years later. It has far exceeded the typical operating life for cooling towers.

Work Item 11004—Chiller, Water Cooled, Remove/Replace—Average 50 Ton

Definition: Remove and replace a water-cooled chiller, including its appurtenances (figure 65).

Typical Life Cycle: 20 years.

Unit of Measure: each (EA).

Considerations:

- Includes removing and replacing wornout centrifugal-, screw-, or piston and cylinder-type chillers or water coolers, 50- to 100-ton capacity, including fittings and connections.
- Water-cooled chillers typically are used in conjunction with cooling towers (work item 11003).
- Units with 60 to 100 tons of cooling capacity are common at Forest Service labs.

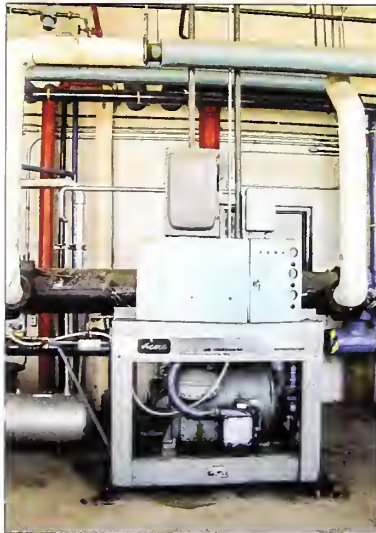


Figure 65—This indoor chiller, installed in 1962, uses water from the cooling tower shown in figure 64. It has far exceeded the typical operating life for chillers. It is inefficient and replacement parts are becoming difficult to obtain. Both the chiller and cooling tower should be replaced in the near future.

Work Item 11005—Chiller, Air Cooled, Remove/Replace

Definition: Remove and replace an air-cooled chiller, including its appurtenances (figure 66).

Typical Life Cycle: 15 years.

Unit of Measure: each (EA).

Considerations:

- Includes removing and replacing wornout, air-cooled chillers, 50- to 100-ton capacity, including fittings and connections.
- Includes air-cooled chillers in any location (typically outside on a pad or on the roof).
- Units with 70 to 100 tons of cooling capacity are common at Forest Service labs.



Figure 66—These chillers still work, but they are inefficient and repair parts are becoming difficult to find. They should be replaced within a few years.

Work Item 11006—Replace Condenser, Air Cooled, 5 Ton

Definition: Remove and replace an air-cooled condenser (figure 67).

Typical Life Cycle: 15 years.

Unit of Measure: each (EA).

Considerations:

- Includes removing and replacing a residential or light commercial air-cooled condenser up to 5 tons of cooling capacity, including fittings and connections.
- Includes replacing pipe because of new refrigerant requirements.
- Includes replacing a condenser to improve energy efficiency, to convert to ozone-saving refrigerants, because the refrigerant pipe insulation is damaged, because it has inadequate clearance, because it is not level, or because it has bent fins or guards.
- Does not include larger units up to about 60 tons that are common at Forest Service labs. Use a custom item for condensers with more than 5 tons of cooling capacity.

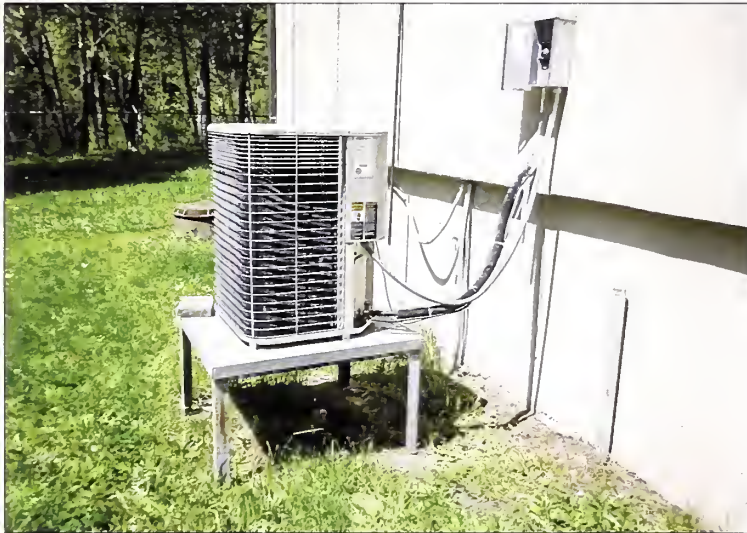


Figure 67—This 3-ton condensing unit is only about 5 years old and is in pretty good condition. It should continue to work well for many more years.

Work Item 11007—Replace Furnace

Definition: Remove and replace a furnace (figure 68), heat pump (figure 69), wood heat stove, or pellet stove.

Typical Life Cycle: 15 years for heat pumps; 20 years for furnaces; 10 to 30 years or more for stoves.

Unit of Measure: each (EA).

Considerations:

- Includes electric, liquid propane, fuel oil, natural gas, wood, coal, or pellet furnaces; water-source or air-source heat pump blower coil units; or free-standing gas, wood, or pellet heat stoves about 20,000 to 150,000 Btu per hour. Includes venting and connection to fuel lines, ductwork, electric power, etc.

- Includes replacing heating systems to improve energy efficiency.
- Does not include heat pumps with underground or under-water exchange tubing, which are custom items.
- Does not include replacing carbon monoxide detectors. Use work item 13006 for carbon monoxide detectors.
- Does not include clearing heat pump condensate lines and terminations, increasing clearance from combustibles, repairing leaks in piping, or changing filters, all of which normally are operations or minor maintenance work.
- Does not include replacing masonry flues or chimneys, which are custom items.

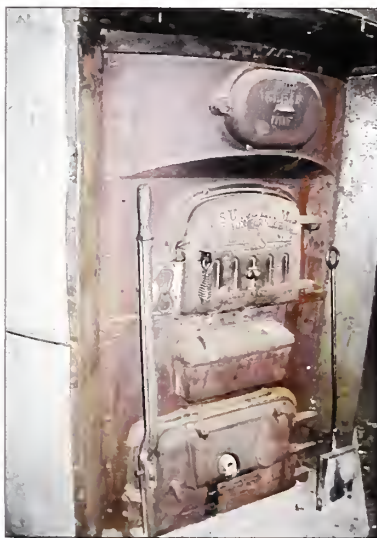


Figure 68—This pre-1930 Sunbeam Fox 1044-BDA model is a ductless furnace. Although it's possible that it has been well maintained and is safe to operate, it's definitely not as efficient as modern furnaces. It should be replaced.



Figure 69—These air-source heat pumps would probably operate acceptably if they were sitting on level pads. The heat pumps are old and not very efficient, however, so they probably should be replaced.

Work Item 11008—Replace Package Terminal HVAC Unit

Definition: Remove and replace a package air-conditioning unit (figures 70 and 71).

Typical Life Cycle: 10 years.

Unit of Measure: each (EA).

Considerations:

- Includes removing and replacing wornout or inoperative through-wall, gas-pack, hotel-type, rooftop, window, suspended-ceiling, or small ductless split-system air conditioners, including fittings and connections, controls, fan motors, compressors, condensers, and refrigerant.
- Includes replacing air conditioners (which vary a lot in efficiency) to reduce energy use.



Figure 70—This split-system air conditioner is severely corroded. If it hasn't already failed, it will soon. It should be replaced.



Figure 71—This window-type air conditioner is permanently mounted in the wall. Check the manufacturer's literature. If this nonstandard installation is unsafe, the air conditioner should be replaced.

Work Item 11009—Unit Heater, Remove/Replace

Definition: Remove and replace an electric (figures 72 and 73) or gas unit heater.

Typical Life Cycle: 15 years.

Unit of Measure: each (EA).

Considerations:

- Includes removing and replacing unsafe, damaged, or inefficient gas or electric unit heaters (single-room size) or gas-fired radiant or infrared tube heaters, including fittings and connections.
- Does not include replacing carbon monoxide monitors if the heaters are gas or oil fired. Use work item 13006 for carbon monoxide detectors.



Figure 72—This 5-kilowatt horizontal electric unit heater is suspended from the ceiling. The wiring installation is inelegant, but all the wiring is protected inside conduit.



Figure 73—Many heaters are designed to be mounted with a specific orientation and are hazardous if mounted improperly. This electric heater was designed to be installed vertically on a wall. It should be replaced with a heater designed to be suspended from a ceiling.

Work Item 12001—Compressor, Air, Remove/Replace

Definition: Remove and replace a permanently mounted air compressor (figures 74 and 75).

Typical Life Cycle: 25 years.

Unit of Measure: each (EA).

Considerations:

- Includes removing and replacing wornout, damaged, or inoperable air compressors that are permanently mounted to a building.
- Does not include portable air compressors, which are personal property.
- Does not include monthly checks on compressors required by OSHA, which is operations work.

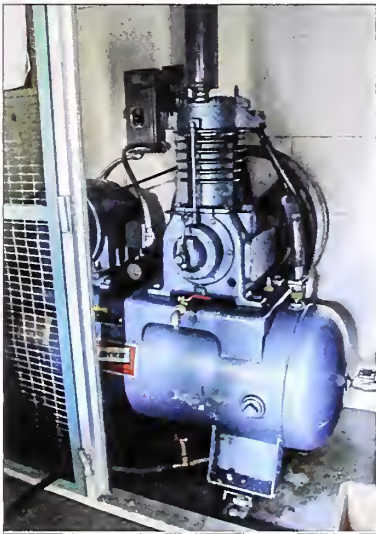


Figure 74—This compressor in a laboratory building is typical of permanently mounted compressors that serve pressure air lines. It operates well and will probably continue to do so for many more years.



Figure 75—This permanently mounted compressor is part of an HVAC system. Although it's not new, it has been well maintained and works well.

Work Item 12002—Elevator, Remove/Replace

Definition: Remove and replace an elevator that serves up to three stories (figures 76 and 77).

Typical Life Cycle: 50 years.

Unit of Measure: each (EA).

Considerations:

- Includes removing and replacing inoperative or unsafe elevators or lifts serving two or three stories, or installing a new elevator that is needed to provide accessibility.
- Does not include elevators for highrise buildings or other long vertical distances. For instance, replacing the elevator that descends 216 feet into Blanchard Springs Caverns on the Ozark National Forest would be a custom item.
- Does not include annual State inspections, repairing leaks in oil reservoirs and piping, or repairing faulty emergency phones, all of which are operations work.



Figure 76—This elevator was installed more than 30 years ago. Although the finish on the door and trim is a little worn, it has many years of service left if it is properly maintained.



Figure 77—This elevator was installed when the building was constructed in 2002. It serves two floors and is a typical size for a Forest Service elevator. It has had a few operational problems that have been corrected promptly. It is serviced regularly and should continue to work well for a long time.

Work Item 12003—Laboratory Fume Hood/Exhaust Hood, Remove/Replace

Definition: Remove and replace an enclosed laboratory fume hood (figure 78).

Typical Life Cycle: 30 years.

Unit of Measure: each (EA).

Considerations:

- Includes removing and replacing wornout or inoperative laboratory-type fume hoods, fume hoods used for painting small items, and other similar enclosed or semi-enclosed countertop exhaust hoods.
- Includes replacement because of inoperative sashes, a compromised enclosure, or because the system is not energy efficient.

- Does not include HVAC exhaust equipment or other exhaust fans not associated with an exhaust hood. Bathroom fans; exhaust fans in shop buildings; residential kitchen hoods; and fans in attics, warehouses, and garages are replaced as maintenance work. These fans have a life expectancy of about 10 years.
- Does not include the annual inspection of fan face velocity and overall function required by OSHA, which is operations work.
- Does not include ductwork. Cleaning, repairing or replacing ducts, duct insulation, duct cement, and duct taping or sealing are usually operations work, but may be a custom item if the work is extensive.



Figure 78—This fume hood has operated satisfactorily since 1961. It doesn't have modern features, but still works because it is well maintained. The fan motor is probably inefficient, however. Replacing the fan is ordinary maintenance work.

Work Item 13001—Main Service Switchgear, < 1200 Amps, Remove/Replace

Definition: Remove and replace the main switchgear at an electric service entrance (figures 79 and 80).

Typical Life Cycle: 20 years.

Unit of Measure: each (EA).

Considerations:

- Includes removing and replacing obsolete, corroded, undersized, or wornout metering and service equipment up to 1,200 amps and 600 volts.
- Includes replacing switchgear for which fuses and breakers are no longer available.
- Does not include transformers.



Figure 79—This typical 1,200-amp main service panel is in good condition and should continue to work well for many more years.



Figure 80—If the rust on the surface of this 100-amp main service panel extends to the interior, it should be replaced.

Work Item 13002—Disconnects or Enclosed Circuit Breakers, Remove/Replace

Definition: Remove and replace an equipment disconnect or enclosed circuit breaker (figures 81 and 82).

Typical Life Cycle: 25 years.

Unit of Measure: each (EA).

Considerations:

- Includes replacing fused, unfused, or enclosed circuit breakers (example: a single circuit breaker in a cabinet) or shutoff switches that serve a single piece of equipment and are located within sight of the equipment that they serve.



Figure 81—Shutoff switches are sometimes grouped near the equipment they serve. These heavy-duty switches are for a pair of elevators. The switches are in excellent condition.



Figure 82—The wiring from the disconnect switch to the compressor in this old shop should not be suspended across the anvil block. The disconnect switch should be replaced with a switch closer to the compressor, and the wiring from the panel to the switch should be encased in rigid conduit secured to the wall.

Work Item 13003—Electrical Panel, Remove/Replace

Definition: Remove and replace an electrical panel (figures 83 and 84).

Typical Life Cycle: 30 years.

Unit of Measure: each (EA).

Considerations:

- Includes removing and replacing an electric load center, lighting, or equipment panel; single- or three-phase; up to 42 spaces and 400-amp rating.
- Includes replacement because of rust and corrosion, growth of the load being served, obsolescence, or possibly because of hot spots revealed by thermography.
- Does not include fitting knockouts with appropriate covers, labeling circuits, or the checking and retightening of electrical connections every few years by a licensed electrician, which are operations or minor maintenance work.



Figure 83—This old electrical panel is a bit rusty. Duct tape was used as an inappropriate substitute for a knockout cover and to indicate which circuits should remain on or off at all times. The circuitry appears to have been modified many times, which is a problem if the work was not performed according to code requirements. This panel should be replaced.



Figure 84—The electrical panel in this photo is a good example of a properly wired and well maintained panel, except that labels for a few of the circuits are missing from the list on the door.

Work Item 13004—Light Fixtures, Remove/Replace

Definition: Remove and replace a light fixture.

Typical Life Cycle: 20 years.

Unit of Measure: each (EA).

Considerations:

- Includes removing and replacing broken or unsafe light fixtures and replacing fixtures to increase energy efficiency.
- Includes fluorescent, incandescent, high-intensity discharge (HID), or light-emitting diode (LED) fixtures, both interior (figure 85) and exterior (figure 86).
- Does not include relamping, replacing yellowed or missing fixture lenses, or replacing wiring channel covers or impact guards, which are operations or minor maintenance work.



Figure 85—This typical, old fluorescent office light fixture uses T-12 tube lamps and a magnetic ballast. It is far less energy efficient than modern fixtures. Although T-12 tubes are still available, this fixture should be replaced in the near future.



Figure 86—This exterior light fixture is simply a ceramic bulb socket mounted under a handmade steel hood. It is unsafe and should be replaced.

Work Item 13005—Emergency Light Fixture, Remove/Replace

Definition: Remove and replace an emergency light fixture (figure 87) or exit light (figure 88).

Typical Life Cycle: 20 years.

Unit of Measure: each (EA).

Considerations:

- Includes removing and replacing obsolete or inoperative emergency light fixtures and exit signs with fluorescent or LED fixtures or signs, or photoluminescent signs.
- Photoluminescent signs must be lit continually by an outside light source to work properly when the power goes out. Work includes adding such a light source.
- Includes replacing fixtures or signs to improve energy efficiency.



Figure 87—Although this emergency light was only 10 years old, it failed yearly operational testing and was repaired three times before the facilities manager replaced it.



Figure 88—The fluorescent exit signs with battery backup at this building continually failed yearly operating tests and required repair. Finally, the facilities manager purchased photoluminescent signs and lit them with inexpensive LED strip lights so that the signs would always be “charged” should the power go out.

Work Item 13006—Fire Alarm and/or Security System, Install

Definition: Remove and replace a fire alarm system (figure 89) or security system.

Typical Life Cycle: 20 years.

Unit of Measure: system (SYSTEM).

Considerations:

- Includes removing and replacing a complete inoperative or obsolete fire alarm or security system, including control panels, fire alarms, hard-wired smoke detectors, carbon monoxide detectors, etc.

- Includes installing a system when none exists. A change in occupancy classification may make adding a system necessary. For instance, converting a former office at a work center to crew quarters may necessitate installing fire alarms, smoke detectors, and carbon monoxide detectors.
- Does not include testing and replacing inoperable individual components of a system (figure 90), which are operations expenses and should be completed immediately.
- Combination fire alarm/intruder alarm systems are common in larger buildings.



Figure 89—This old fire alarm system is obsolete. Even if it still works, it probably should be replaced.



Figure 90—The hard-wired smoke alarm system in this building is fine, but a smoke detector is missing (circled) and should be replaced immediately using operations funding.

Work Item 13007—Lightning Protection System, Remove/Replace

Definition: Remove and replace a lightning protection system (figures 91 and 92).

Typical Life Cycle: 25 years.

Unit of Measure: system (SYSTEM).

Considerations:

- Includes removing and replacing a complete lightning protection system for a building or lookout/observation tower.
 - » Refer to “Evaluating Lightning Protection on Lookouts and Communication Facilities” <http://www.fs.fed.us/t-d/php/library_card.php?p_num=0873_2333> for detailed information about inspecting lightning protection systems and requirements for proper systems.
 - » Lightning protection systems are particularly

important in rural and remote areas, and are mandatory for all lookout/observation towers.

- Includes design for the particular building or tower and installation under the direction of a licensed professional engineer or a master lightning protection installer certified by the National Fire Protection Association (NFPA), Underwriter Laboratories (or another listing agency), or the Lightning Protection Institute.
- Includes removing and replacing cables, excavating for a ground rod, installing a 5/8-inch-diameter, 10-foot-long ground rod and ground clamp or radials, installing lightning rods (air terminals), installing down conductors, installing bonding clamps, and backfilling over the ground rod.
- Does not include systems that protect large electronic equipment from lightning surges. These systems are a custom (and very expensive) item.

- Does not include the yearly preopening inspection of lightning protection systems for lookout towers, which is an operations cost.
- Does not include expert inspection every 5 years, per NFPA 780 B.5. Major work items identified during the expert inspection need to be added to the NRM Infra database. Minor work items should be accomplished using operations or maintenance funds.

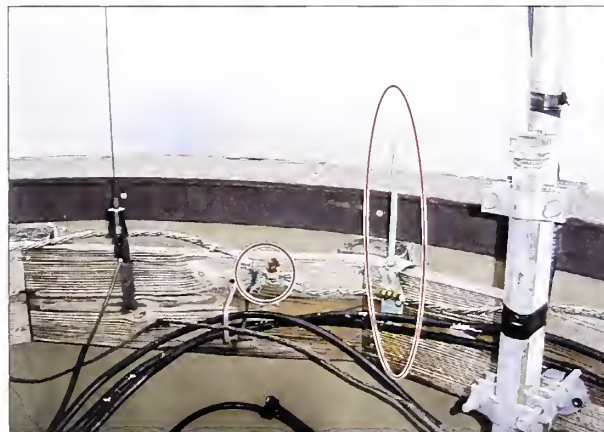


Figure 91—This lightning protection system includes a clamp that doesn't grab all the strands, an air terminal that is far from being the tallest conductor on the roof, and many unbonded metal items. The system should be given a major overhaul or should be replaced.



Figure 92—This ground conductor isn't secured and the terminus (circled) doesn't even come close to the ground rod. If the rest of the system is as inadequate and poorly maintained, it should be replaced. If the rest of the system is okay, the ground conductor should be replaced immediately using maintenance funds.

Work Item 14001—Fire Sprinkler System, Remove/Replace

Definition: Remove and replace a wet-pipe or dry-pipe fire sprinkler system (figure 93).

Typical Life Cycle: 40 years.

Unit of Measure: square feet (SF).

- Calculate the square feet of floor space to be protected by the system.

Considerations:

- Includes removing and replacing inoperative fire sprinkler systems.
 - » Be sure to check the code requirements to determine whether the system is adequate. A variety of NFPA standards apply, including NFPA 13, 13D, 13R, 101, and 914.

- Includes installing a new system where required and where none currently exists, especially to comply with code when renovating an existing building.
 - » Consider installing fire sprinkler systems to protect sleeping quarters, historic structures, and structures with high-value or irreplaceable contents, even when not required by code.
- Does not include required regular testing on existing systems, which is operations work.



Figure 93—The system that includes this fire sprinkler is 10 years old and in good condition. Replacement should not be necessary for many years.

Work Item 15001—ABA Mitigation

Definition: Custom work item. Modify a building to provide accessibility to people with disabilities, as required by the Architectural Barriers Act Accessibility Standards.

Typical Life Cycle: none.

Unit of Measure: lump sum (LS).

Considerations:

- Includes any work that must be done to meet accessibility standards inside the building or to the porch, deck, entry steps, or other assemblies directly tied to the building.
 - » Interior barriers often include halls or doors (figure 94) that are too narrow or toilet rooms that are too small or configured improperly.

» Exterior barriers often include lack of a ramp or door thresholds (figure 95) that are too high.

- All work under this item is specific to each building; there is no standard unit cost.
- Enter all building accessibility improvements using this item so that the accessibility work can be tracked.
 - » If any work is consistent with a standard work item, use the unit cost numbers from the standard work item, but calculate the total and enter it as a lump sum under this item. Note how the cost is generated (RS Means or borrowed from a standard work item) in the remarks section.
 - » In some cases, it will be easiest to estimate the cost of completely replacing the affected portion of the building.



Figure 94—This 26-inch-wide door opening cannot be widened enough to accommodate a 36-inch-wide door. The bathroom can't be made accessible. It must be enlarged and completely rebuilt if accessibility is required.



Figure 95—This 36-inch-wide door is retrofitted with a beveled threshold to provide accessibility.

Work Item 16001—Lead Based Paint/Asbestos Mitigation

Definition: Custom work item. Remove or mitigate asbestos material (figure 96) or lead-based paint (figure 97) in or on a building.

Typical Life Cycle: none.

Unit of Measure: lump sum (LS).

Considerations:

- Includes lead-based paint or asbestos removal or abatement work performed in accordance with National Emission Standards for Hazardous Air Pollutants (NESHAP), EPA, and OSHA requirements.
- All work under this item is specific to each building; there is no standard unit cost.

- Enter all lead-based paint and asbestos work using this item so that the work can be tracked.
 - » Calculate separate totals for lead-based paint and for asbestos work for the building and enter each as a lump sum.
 - » If work is consistent with a standard work item, use the unit cost numbers from the standard work item, but calculate the total and enter it as a lump sum under this item. Note how the cost is generated in the remarks section.
- See the Facilities Toolbox for more information about working with and removing asbestos at <http://www.fs.fed.us/eng/toolbox/haz/haz02.htm> and lead-based paint at <http://www.fs.fed.us/eng/toolbox/haz/haz03.htm>.



Figure 96—This intact transite pipe manufactured before 1980 is a Category II asbestos-containing material. It does not have to be removed unless it is in poor condition or is coming apart.



Figure 97—This crew is properly suited, certified, and equipped to remove lead-based paint from an old Forest Service building.

Work Item 16002—Environmental Mitigation

Definition: Custom work item. Remove or abate an environmental hazard in or on a building.

Typical Life Cycle: none.

Unit of Measure: lump sum (LS).

Considerations:

- Includes removing or abating hazardous substances other than lead-based paint and asbestos in buildings. See the Facilities Toolbox hazardous materials section at <http://www.fs.fed.us/eng/toolbox/haz/index.htm> for more information.
- Includes large mold infestations (figure 98).

- Does not include lead-based paint or asbestos—see work item 16001.
- All work under this item is specific to each building; there is no standard unit cost.
 - » Enter all environmental mitigation work using this work item so that the work can be tracked.
 - » If work is consistent with a standard work item, use the unit cost numbers from the standard work item, but calculate the total and enter it as a lump sum under this item. Note how the cost is generated in the remarks section.



Figure 98—Removing this substantial mold infestation in a pump room requires a lot of work. The leak also must be fixed (a water/wastewater project), and continuous ventilation probably should be added to the room.

Custom Work Item—No Assigned Work Item Number

Definition: Custom work item.

Typical Life Cycle: Not applicable.

Unit of Measure: varies.

Considerations:

- Includes work that is not one of the standard items on the form, but is of significant value relative to the building value.
 - » Suggest recording items that are at least 1 percent of the total building value, or more than \$10,000.
- Does not include small or routine items—these items are part of routine facilities operations and maintenance practices.

• Custom work item examples:

- » Chip sealing a driveway or parking lot.
- » Replacing a concrete porch or stoop.
- » Overlaying, repairing, or replacing large concrete or masonry slabs, walls, chimneys, or other structural elements.
- » Replacing a retardant tank or plumbing at an air tanker base.
- » Replacing a refrigeration unit for a tree seedling cooler.
- » Replacing structural components or guy cabling on a fire lookout tower.
- » Replacing large expanses of glazing or the support structure on a greenhouse.

- » Conducting extensive restoration work on a historic log structure.
- » Replacing a snow-damaged flue for a woodburning stove and installing a cricket to protect against future damage.
- » Replacing swinging or sliding historic garage or warehouse doors in kind.
- » Replacing large expanses of plaster, premium wood paneling, or other high-end wall surfaces in kind.
- » Replacing storefront windows (large expanses of metal-framed glass typically surrounding an entry door).

- » Replacing an oversize, freestanding commercial kitchen or laboratory sink.
- » Replacing a large, air-cooled condenser with more than a 5-ton capacity.
- » Replacing underground or underwater exchange tubing for a heat pump.
- » Exterminating termites or other insects and replacing extensively damaged structural members.
- » Performing extensive rodent disinfection and deterrence (structure modification).

- To record custom work items, use the “RS Assem,” “RS Unit\$” or “Mtnce/Rpr” tabs (figure 99). You may need to choose the item listed in RS Means that is closest to the work you need and note any differences in the “Remarks” section.

» Custom work items not included in RS Means may be needed for specialized assets.

Work Items

Welcome, KSNOGRASS

Task List: Basic | Complex | **RS Assem** | RS Unit\$ | Mtnce/Rpr

To remove an item, double-click it.

Select one or more items from list:

01 General Requirements
02 Existing Conditions
03 Concrete
04 Masonry
05 Metals
06 Wood, Plastics and Composites
07 Thermal and Moisture Protection
08 Openings
09 Finishes
10 Specialties
11 Equipment
12 Furnishings
13 Special Construction
14 Conveying Equipment
21 Fire Suppression
22 Plumbing

Features:

Select	*Needed\$	Cost Factor	*Task Type	Task ID	Description	Actual\$	Complete
	\$92,056.00	1.244	DEFERRED MAINTENANCE	481513501000	Wind turbines, package, 20 kW, 31' dia incl labor & material, mn		<input type="checkbox"/>
	\$42,555.56	1.244	DEFERRED MAINTENANCE	04002	Premium Roof, Metals/Membrane/Shales, Removal and Replacement		<input type="checkbox"/>
	\$12,907.74	1.244	DEFERRED MAINTENANCE	02001	Parking lot, repair and seal coating (per 10,000 S.F.)		<input type="checkbox"/>
	\$24,490.38	1.244	DEFERRED MAINTENANCE	02003	Concrete, sidewalk or curb, Remove/Replace		<input type="checkbox"/>

*Reason: FOREST MISSION *Priority: NONCRITICAL Task Creation Date:

*Planned Start: 9/15/2011

Remarks: This is actually a photovoltaic system, not wind. No items for solar. Total system is 50 kW. This is 40 kW of it.

*Costs:

Quantity	2				
Line#	Dollar Unit	Material	Labor	Equipment	Description
481513501000	\$49,900.00	System	\$0.00	\$0.00	\$0.00 Wind turbines, package, 20 kW, 31' dia incl labor & material, mn

Figure 99—This screen shot shows the NRM Infra database Work Items tabs for custom items.

That's it. Congratulations! You have completed the facilities condition assessment for the building.

Library Card

Snodgrass, K.; Marks, K. 2014. Facilities condition assessment field training guide. 1473–2830–MTDC. Missoula, MT: U.S. Department of Agriculture, Forest Service, Missoula Technology and Development Center. 142 p.

This booklet is a training guide and a memory-jogger for Forest Service employees who are trained to do facilities condition assessments. The format enables inspectors to easily reference necessary information onsite and to easily conduct assessments in a manner that is consistent throughout the Forest

Service. Each work item has its own page that includes photos, guidance on whether the item applies to the building being inspected, the normal useful life of the item, and how to measure and record the quantity of necessary work.

Keywords: assessment, basic, building, complex, condition, construction, database, deficiencies, energy, facility, facility engineers, facilities, Infra, inspect, inspections, lweb, maintenance, measure, natural resources manager, NRM, operations, quantity, record, survey, work item.

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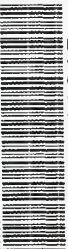
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